EVA Series Powered Air-Purifying Respirator Blower Assembly User Manual

EVA1 - Powered Air-Purifying Respirator

(for use with Loose-Fitting Headtops)

US-NIOSH	**Powered Air-Purifying Respirator with High Efficiency (HE) Filters - Approval No. TC-21C-0836** **Powered Air-Purifying Respirator with OV-AG-HE Filter Cartridges for organic vapors, chlorine, hydrogen chloride, sulfur dioxide, chloride dioxide, hydrogen fluoride and particulates – Approval No. TC-23C-2510**
EUROPE-EN	**CE 0194** **EN 12941 TH3 20TIC, 20SIC, RT3, RT4, 20LFL, 20LFM, 20LF2L, 20LF2M, 20LF2S** **EN 12941 TH2 20TICH, 20SICH, 20SICVH** **INSPEC** **56 Leslie Hough Way** **Salford** **Greater Manchester** **M6 6AJ** **United Kingdom**

Cautions and Limitations

A. Not for use in atmospheres containing less than 19.5% oxygen.

B. Not for use in atmospheres immediately dangerous to life or health.

C. Do not exceed maximum use concentrations established by regulatory standards.

F. Do not use respirator if airflow is less than four cfm (115 lpm) for tight fitting face pieces or six cfm (170 lpm) for hoods and/or helmets.

H. Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridges and canisters are replaced before breakthrough.

I. Contains electrical parts that may cause an ignition in flammable or explosive atmospheres.

J. Failure to properly use and maintain this product could result in injury or death.

K. The Occupational Safety and Health Administration regulations require gas-proof goggles to be worn with this respirator when used against formaldehyde.

L. Follow the manufacturer's user instructions for changing cartridges and/or filters.

M. All approved respirators shall be selected, fitted, used and maintained in accordance with MSHA, OSHA and other applicable regulations.

N. Never substitute, modify, add or omit parts. Use only exact Bullard replacement parts in the configuration as specified by the manufacturer.

O. Refer to User's Instructions and/or maintenance manuals for information on use and maintenance of these respirators.

P. NIOSH does not evaluate respirators for use as surgical masks.

* At very high work rates, the pressure in the device may become negative at peak inhalation flow.

⚠ WARNING

Use strictly in accordance with instructions, labels and limitations pertaining to the EVA Series respirator.

1. The EVA Series respirator does not supply oxygen. Use only in adequately ventilated areas containing at least 19.5% oxygen.
2. Do not use when concentrations of contaminants are immediately dangerous to life or health (IDLH). This term is defined in 29CFR 1910.134 (b).
3. Do not use these respirators for respiratory protection during abrasive blasting or clean up.
4. Do not use in circumstances where the airborne concentration level of contaminant exceeds maximum use concentration for this type of respirator as established by regulatory standards.
5. Leave area immediately if:
   - Breathing becomes difficult
   - Dizziness or other distress occurs
   - You taste or smell the contaminant
   - Unit becomes damaged
   - Battery alarm activates
   - Low Flow alarm activates
6. This apparatus must not be worn with the blower unit switched off. If the blower is switched off, a rapid build-up of carbon dioxide and depletion of oxygen may occur, which could result in death or serious injury.
7. Never alter or modify this respirator. Use only Bullard NIOSH-approved EVA Series components and replacement parts for this respirator.
8. This device is not immune to highly powered RFI/EMI emissions.

Failure to follow these warnings could result in death or serious injury.

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EVA Series - Principle of Operation

The EVA Series Powered Air-Purifying Respirator (PAPR) System is configured in six parts:

1. The blower and belt assembly:
   EVA1 Blower Unit
   EVABELT1 Comfort/Decon Belt
   PA1AFI Air Flow Indicator (sold separately)
2. The battery pack (Part No. EVABAT1). One fully charged pack will power the blower for approximately four to ten hours depending upon factors such as speed, cartridge selected and cartridge loading.
3. The breathing tube, which is available in two different types and three lengths:
   PAHT Powered Air Hood Breathing Tube Assembly (standard length)
   PAHTXS Powered Air Hood Breathing Tube Assembly (short length)
   PAHTXL Powered Air Hood Breathing Tube Assembly (long length)
   PA1BT Hood breathing tube assembly with clamp (standard length)
   PA1BTXS Hood breathing tube assembly with clamp (short length)
   PA1BTXL Hood breathing tube assembly with clamp (long length)
   PA20LFBT Loose fitting facepiece breathing tube assembly (standard length)
   PA20LFBTXS Loose fitting facepiece breathing tube assembly (short length)
   PA20LFBTXL Loose fitting facepiece breathing tube assembly (long length)
4. The High Efficiency Particulate Absolute (HEPA) filter or chemical filter cartridge.
5. The hood with headband suspension (except for the RT Series) and/or hard hat, or loose fitting facepiece. The following hood models may be used with the EVA Series blower unit:
   GRH/GRHT Grinding hood with inner bib
   RT1/RT1T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   RT2/RT2T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   RT3/RT3T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   RT4/RT4T Hood with long inner and outer bib (NIOSH approved for use without a headband suspension)
   20TJ/20TJT Hood
   20TIC/20TICT Hood with inner bib
   20TICH/20TICHT Hood for use with Bullard hard hat
   20TICS/20TICST Hood with taped and sealed seams
   20SIC/20SICT Hood with taped and sealed seams
   20SICV/20SICVT Hood with taped and sealed seams and PVC lens
   20SICH/20SICHT Hood with taped and sealed seams for use with Bullard hard hat
   20SICVH/20SICVHT Hood with taped and sealed seams and PVC lens for use with Bullard hard hat
   20TPC/20TPCT Hood with solvent resistant lens and inner bib
   20TP/20TPT Hood with solvent resistant lens
   20LFM Loose fitting facepiece, medium size
   20LFL Loose fitting facepiece, large size
   20LF2M Loose fitting facepiece (narrow profile), medium size
   20LF2L Loose fitting facepiece (narrow profile), large size
   20LF2S Loose fitting facepiece (narrow profile), small size
6. The Battery Charger:
   EVASMC Quick charger (single port)
   EVAGC Gang charger (six port)

The blower unit draws in ambient air through the cartridges. The purified air is blown into the wearer's hood through the breathing tube. A flow indicator is provided to check that there is an adequate volume of air available to the wearer prior to use. The system is designed to operate at a minimum air flow of approximately seven cubic feet of air per minute (210 liters per minute) in the hood under normal use on the standard speed setting, and eight and one-half cubic feet of air per minute (241 liters per minute) in the hood under normal use on the high speed setting. A feedback loop from the Mass Flow Sensor to the impellor continually monitors and adjusts the air flow to keep it constant at the design set point.

The units are designed for use at temperatures from 10ºF to 120ºF (-12ºC to 49ºC). The battery pack mounts in a compartment on the back of the blower. A fully charged battery pack will power the blower for approximately four to ten hours depending upon factors such as speed selected, cartridge selected, and filter/cartridge loading.

The EVA Series Blower is equipped with two alarms: A 77 db continuous alarm will sound when the air flow falls below approximately 170 lpm (6.0 CFM) and a 77db intermittent chirp alarm will activate to indicate that the battery has approximately 15 minutes of remaining capacity.

Type C Airline Respirators CC20 Series (TC-19C-154), RT Series (TC-19C-412), GRH Series (TC-19C-412)

Most of the same headpieces approved for use with the CC20, RT, and GR50 Series of supplied air respirators (SAR) are also approved for use with the EVA Series of powered air-purifying respirators. CC20, RT and GR50 Series respirators provide a high level of respiratory protection and user comfort over long work periods, in a wide variety of hazardous environments.

The CC20, RT and GR50 SAR air flow control devices and other components are described in the CC20, RT and GR50 Series User Instructions.

Battery Pack

One fully charged battery pack will power the blower for approximately four to eight hours depending upon factors such as speed selected, cartridge selected and filer/cartridge loading.

NOTE

The battery has built-in short circuit protection. In the event of a short circuit, an internal polyfuse will trip. The fuse will reset itself within 5-10 seconds allowing the battery to resume normal operation.

To charge the battery pack, do the following:

- Press the battery release on the pack to remove the battery from the back of the blower. (See Figure 1.)

Figure 1

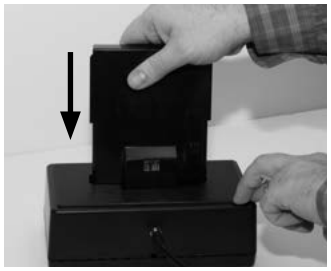

Figure 2

- Place battery upside down into the charging port of the battery charger. (Figure 2.)
- Connect the battery charger to a 110-volt AC electrical outlet.
- Charge the battery pack for approximately four hours.

While the battery is charging, the light on the charger will remain red. The charger light will illuminate green when charging is complete.

Table-top gang chargers EVAGC with 6 ports are also available.

Diagnostic functions are available for chargers (upon special order) including access to data such as number of cycles of operation, remaining charge capacity, etc. Details for these functions are available in the EVASMC2 charger user manual (upon special order).

⚠ WARNING

DO NOT charge batteries in hazardous areas.

Battery Storage

Storage of Li Polymer batteries is relatively easy. Unlike Nickel batteries, they lose a very small amount of power (less than 0.5% per day) and therefore can be charged and stored ready for use. If long-term storage is required, it is best to store the battery in a cool place with at least 40% charge still remaining.

NOTE

Discharging and re-charging the battery fully at least once every 3 months is suggested to ensure the longest possible life of the battery. Do not leave on the charger for more than 30 consecutive days.

To maximize battery life, these guidelines should be followed:

- Remove the battery from the blower unit when not in use.
- Charge the battery before it is completely discharged. The low battery alarm indicates that the battery needs to be charged. The battery is designed with a circuit to protect the battery. It will not allow the battery to be discharged below a safe voltage for the cells, regardless of airflow, without the alarm sounding. When the battery reaches the voltage cutoff it will automatically cease operation.
- Always charge the batteries at room temperature or cooler. At higher temperatures, the battery pack may not accept a full charge. If the battery pack feels hot, let it cool for 30 minutes before charging.
- Do not charge battery packs in an enclosed cabinet without ventilation.

Battery Fuel Gauge:

EVA Battery Packs are equipped with an on-board fuel gauge to indicate the amount of remaining capacity left in the battery pack. To check the remaining capacity, simply depress the button labeled "Push" and LEDs will illuminate indicating the level of battery capacity remaining. When fully charged all four LEDs will illuminate green, and when 25% or less charge is available a single LED will illuminate red.

Figure 3

Pre-Operational Inspection

Prior to each work shift, perform the following Pre-Operational Inspection to ensure proper operation and to ensure that the unit is completely assembled.

1. Belt Mounted Blower Unit, Part No. EVA1

- Check that the unit is clean and undamaged.
- Inspect for deterioration, physical damage and improper assembly.

2. Filter/Cartridges

- Inspect the filter/cartridge for any physical damage
- Check the label to ensure the filter/cartridge has not exceeded its "use-by" date.
- Inspect the gasket on the filter for any physical damage.

NOTE

Each filter comes with a permanent gasket.

- Ensure that the correct filter/cartridge is appropriate for the contaminant.
- Consult the NIOSH approval label and your own in-plant safety professional if you have any questions as to the suitability and efficiency of the Air-Purifying Element.
- Screw the cartridge into the port until hand-tight and the locking tab is secure. (Refer to Mounting and Replacing Filters on Blower Unit on page 5)

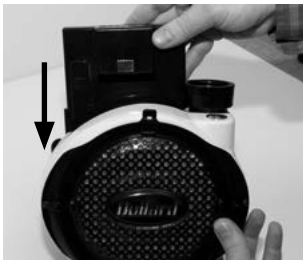
Figure 4

3. Battery Pack

- Check that the battery is not damaged.
- Check the Fuel Gauge to determine sufficient charge is available.
- Place the battery pack in the battery compartment on the blower.
- The battery tab should click when completely engaged. (See Figure 4)

4. Hood with Suspension or Hard Hat, or Loose Fitting Facepiece

- The hood is constructed of one of the following materials: Tychem QC, Tychem SL or Nomex (GRH).
- Depending on the model of the hood selected, it may be used with either a headband suspension or a hard hat (Note: RT Series hoods are NIOSH approved without a headband suspension or a hard hat).
- The loose fitting facepiece is constructed of Tychem QC and features an internal suspension.
- Inspect the hood or loose fitting facepiece for any physical damage.

Mounting the Breathing Tube on the Blower

- Ensure that a rubber gasket is in place in the breathing tube coupler on the blower unit.
- Screw one end of the breathing tube into the blower unit. (Hand tight is sufficient.) (See Figure 5)
- Ensure that neither the breathing tube nor the filter is blocked.
- Ensure that the ON/OFF Switch is in the OFF position.
- Switch on the blower by pressing the on/off button for 1-2 seconds confirmed by a short beep.
- If the Low Battery Alarm sounds at this time, the battery needs to be recharged. See instructions on page 2 regarding properly charging the battery.
- If the Low Flow Alarm sounds at this time, the hood, breathing tube and filter should be check for a blockage.

Figure 5

Checking Airflow with the Airflow Indicator (PA1AFI - sold separately)

Figure 6

With the blower switched ON and the filters/cartridges mounted, take the free end of the breathing tube in one hand, hold it upright and place the Airflow Indicator into the end of the tube. (See Figure 6).

Apply a light downward pressure to the Airflow Indicator to get a reasonable seal at the breathing tube end. Ensure that the air outlet holes in the Airflow Indicator tube are not blocked. Two hands may be used if preferred, one to hold the breathing tube and one to hold the Airflow Indicator.

The position of the ball in the Airflow Indicator should be observed. If any part of the ball is below the PASS LINE on the Airflow Indicator, check for:

- Blower malfunction.
- Clogged or damaged Air-Purifying filter elements on the HE filter. See "Mounting and Replacing Cartridges on the Blower Unit" on page 7.
- Low battery or battery malfunction.

If the ball is completely above the PASS LINE on the Airflow Indicator, then the system is ready for use.

⚠ WARNING

If the blower malfunctions during use in a hazardous area:

Remain calm and **LEAVE** the hazardous area immediately.

DO NOT use a blower that fails the flow test (air flow indicator sold separately).

Use **ONLY** Bullard filter/cartridges which comply with and have the NIOSH approval label and which are appropriate for the contaminant.

Failure to observe these warnings could result in death or serious injury.

EVA Series PAPR Air-Purifying Elements

Principle of Operation

The following filter/cartridge protection classification applies when used with any of the hoods or loose fitting facepieces.

NIOSH Filter/Cartridges		
Protection	**Filter/Cartridge**	**NIOSH / ANSI Color Code**
HE (particulate)	PAPRFC3	Magenta
OV/CL/HC/SD/CD/HF/HE	PAPRFC4	Olive and Magenta

EN Filter/Cartridges*		
Protection	**Filter/Cartridge**	**Color Code**
EN12941 P3	PAPRFC3	White
A2P3 P3 R S L EN12941	PAPRFC4	White, Brown, Grey, Yellow

⚠ WARNING

*The user should not confuse the markings on a filter relating to other standard other than EN 12941 with the classification of this device when used with this filter.

HE particulate filters are 99.97% effective against all particulate aerosols.

Filters are supplied in quantities of three per box.

The following abbreviations are approved by NIOSH to indicate the particulates, gases, or vapors which are removed by the gas/vapor cartridges:

HE High Efficiency Particulate Air Filter for Powered Air-Purifying Respirators

⚠ WARNING

Use only the filter/cartridge(s) described in the above table.
Do not change cartridges while in a hazardous atmosphere.
Incorrect cartridge selection will invalidate all performance statements and approvals for this equipment.
Follow established cartridge change schedules to ensure that cartridges are replaced before breakthrough occurs.
Failure to follow these warnings could result in death or serious injury.
*DO NOT fit filters directly to the hood.

Mounting and Replacing Filters on the Blower Unit

Figure 7

High efficiency particulate filters must be replaced when retained particles clog the filters and reduce air flow below acceptable levels, as indicated by testing with the Air Flow Indicator as described at left.

To Replace Filters

- Remove the air-purifying element from its packaging, and inspect for damage. If in doubt do not use.
- Check that the air-purifying element has not exceeded its "use-by" date.
- Check that the filter connecting thread and gasket are in good condition.
- Check that the air-purifying element is appropriate to the hazard. If in doubt consult your respirator program administrator or supervisor.
- Check that the threads in the blower unit port are in good condition and clear of contaminant.
- Screw the air-purifying elements into the receptacles (see Figure 8) until the cartridge is hand tight. DO NOT OVERTIGHTEN.
- Check to see that the locking tab is secure. (see Figure 9)

To Replace Combination Filter/Cartridge

- Follow the steps above, but beware that the filter locking tab is beneath the filter rim. (see Figure 10)

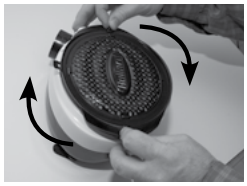

Figure 8

Figure 9

Figure 10

Installing and Removing the Belt on the Blower Unit

To install the belt

- With the blower filter side down, orient the lever locks as shown in Figure 11
- Lay belt over blower as shown in Figure 12
- Rotate level locks until they are oriented as shown in Figure 13

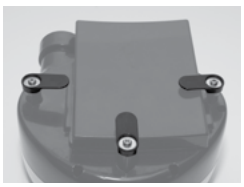

Figure 11

Figure 12

Figure 13

To Remove the Belt

- With the blower filter side down, orient the lever locks as shown in Figure 12
- Remove belt from blower

NOTE

Plastic insert may be removed for cleaning as shown in Figure 14-15 . See back page for more information on cleaning.

Figure 14

Figure 15

Donning the Blower and Respirator

Initial Donning

Prepare to don the blower, battery and hood in a safe, hazard-free area and do the following:

- Ensure that the filter/cartridges used are suitable for the contaminant in question and are compatible with the EVA1 Blower Unit.
- Check that the filter/cartridge is properly mounted on the blower unit.
- Place the battery in the battery compartment on the back of the blower.
- Fit the blower and belt around the user's waist and adjust the belt for a comfortable fit (suspenders are also available).
- Remove the belt and blower to install the hood or loose fitting facepiece and corresponding breathing tube.

⚠ WARNING

The use of any filter/cartridge not approved with the EVA1 blower unit may put the user at risk and could result in death or serious injury.

Donning the EVA with the CC20 Series or GR50 Series Hood

Adjusting and Installing Headband Suspension in Hood

NOTE

20LF and 20LF2 series loose-fitting facepiece hoods have a sewn-in headband.

NOTE

The 20SICH, 20TICH and GRH Hoods may use a hard hat or suspension.

NOTE

RT Series hoods do not use a suspension.

To change the headband size, unlock the four pins from the sizing holes. Place the headband on your head. Pull down, allowing headband to expand until it feels comfortable. The headband will automatically adjust to your size. Lock into place by pushing the four pins into the sizing holes (Figure 16).

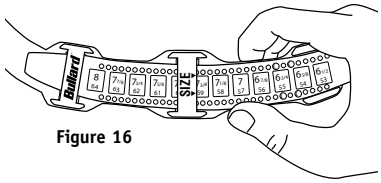

Figure 16

NOTE

If using the optional 20RT ratchet headband suspension, refer to the instruction sheet provided with the 20RT.

Adjust Crown Straps for Vertical Fit

To improve suspension comfort, adjust crown straps vertically by repositioning the crown strap posts in the crown straps. Vertical adjustment makes the headband ride higher or lower on the wearer's head. To adjust, push crown strap post from slot, move to new slot, and snap in to secure. Move key to desired vertical position. Repeat for other crown strap post (Figure 17).

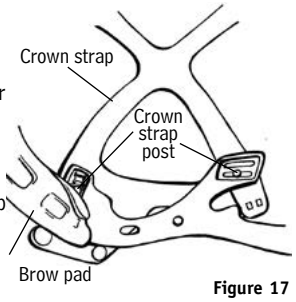

Figure 17

NOTE

If the hood rises off your head during use, first verify proper air pressure, then select a different hood for your application, or use the optional chin strap.

Adjusting and Installing Hard Hat in Respirator Hood (20SICH & 20TICH or GRH)

1. Assemble and adjust the standard Bullard hard hat suspensions RS4PC or RS6PC or the optional ratchet suspensions RS4RC or RS6RC by following the directions on instruction sheet attached to headband on hard hat. Read all hard hat warning labels and instructions. The following Bullard hard hat models are NIOSH approved for use with CC20 Series and GR50 Series respirator hoods: C30, C30R, S51 and S51R.
2. If desired, install and adjust optional ES42 hard hat chinstrap.
3. Before inserting hard hat into hood, remove the two adhesive-backed Velcro® strips attached to the Velcro piece that is sewn into the hood (see Figures 19 & 20).
4. Peel the backing off the longer Velcro tab and apply it to the inside center rear of the hard hat, about 1/4" up from the edge. Apply shorter Velcro tab to the underside of the brim of the hard hat (see Figure 19).

Figure 18

5. Insert hard hat into respirator hood with cap visor facing front of hood (see Figure 18).
6. Tuck cap brim on top of front elastic Velcro band sewn into hood (see Figure 19).
7. Loop the Velcro strip sewn inside the hood around the back of the cap and affix it to the corresponding Velcro tab previously installed inside the hard hat in step 4 (see Figure 20).
8. Remove protective plastic from plastic lens of respirator hood. If desired, apply optional 20LC or 20LCL adhesive-backed lens covers designed to protect the respirator's plastic lens. Apply 2-3 lenses at a time. When lens becomes soiled, remove by pulling tab at edge of lens cover to clear your vision.

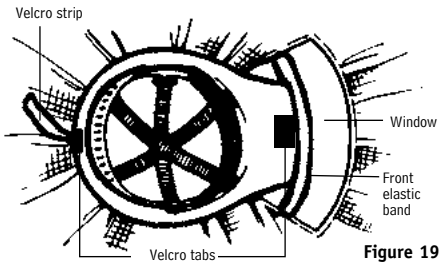

Figure 19

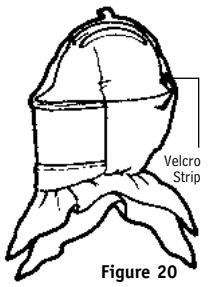

Figure 20

Installing Breathing Tube Assembly in CC20 or GRH Hoods

For hoods without a threaded port at the rear, Breathing Tubes PA1BT, PA1BTXS and PA1BTXL will attach to the hood with a clamp as follows:

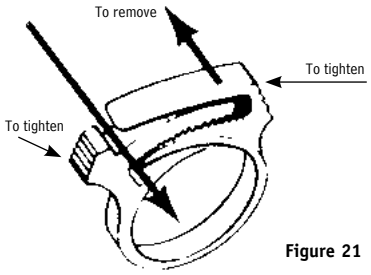

Figure 21

1. Remove nylon clamp from plastic anchor plate on hood (see Figure 21).
2. Insert the open end of the breathing tube approximately five inches into hood's air entry sleeve (see Figure 22). Do not insert breathing tube into hood air entry sleeve more than 6 inches as it may cause a flow restriction.

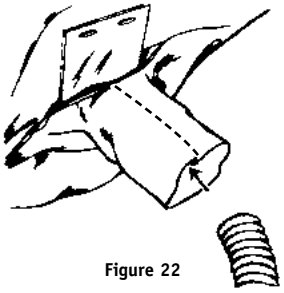
Figure 22

3. Install nylon clamp over air entry sleeve and breathing tube, inserting clamp locks through two holes in plastic anchor plate that is sewn into hood. Locks should face away from user's neck (see Figure 23). The air entry sleeve seams should be on the top and bottom of the breathing tube when properly installed and worn.
4. Engage clamp locks and squeeze together until tight. Air entry sleeve should not be twisted or restricted (see Figure 24). If so, then remove the clamp and repeat steps 2-4.

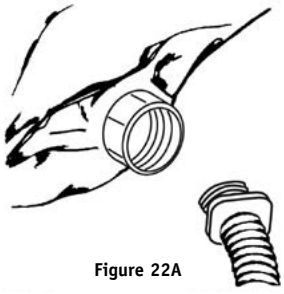
Figure 22A

For hoods with a threaded port at the rear (designated with a "T" suffix), Breathing Tubes PAHBT, PAHBTXS, PAHBTXL will attach to the hood by the threading into the port at the rear (See Figure 22A).

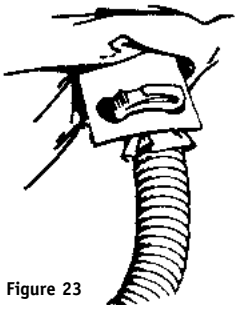
Figure 23

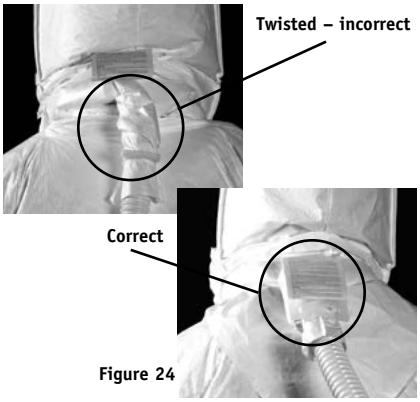

Figure 24

> **⚠ WARNING**
>
> Do not put on or remove these respirators in a hazardous atmosphere except for emergency escape purposes. Failure to heed these warnings could result in death or serious injury.

Donning the CC20 or GRH and EVA

1. With PAPR Blower Unit Running, put on CC20 or GRH Series respirator hood.
2. Position headband suspension or hard hat for a comfortable fit.
3. If using an optional chin strap, pull elastic strap under your chin. Adjust for a secure and comfortable fit.
4. Tuck inner bib of hood into shirt or protective clothing if using hood with inner bib (see Figure 25).
5. Pull respirator outer bib over collar of shirt or protective clothing.
6. Ensure that the neck cuff is down below the chin and that the air outlets of the cuff (see Figure 26) are not restricted. If the neck cuff is not below the chin, then pull down before continuing (See Figure 27).

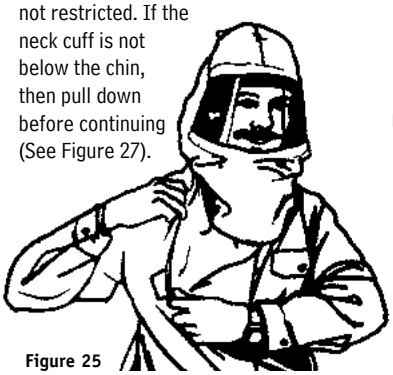
Figure 25

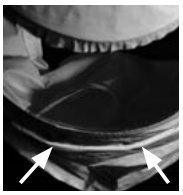
Figure 26

Figure 27

RT Series Hood Use

Installing Breathing Tube Assembly in RT Series Respirator Hoods

For hoods without a threaded port at the rear, Breathing Tubes PA1BT, PA1BTXS and PA1BTXL will attach to the hood with a clamp as follows:

1. Remove nylon clamp from the breathing tube (see Figure 22).
2. Insert the open end of the breathing tube approximately five inches into hood's air entry sleeve (see Figure 28). Do not insert breathing tube into hood air entry sleeve more than 6 inches as it may cause a flow restriction.

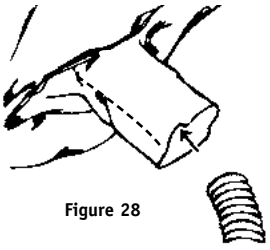
Figure 28

3. Install nylon clamp over air entry sleeve and breathing tube. If desired, 2 or more clamps may be used(see Figure 29). The air entry sleeve seams should be on the sides of the breathing tube when properly installed and worn.

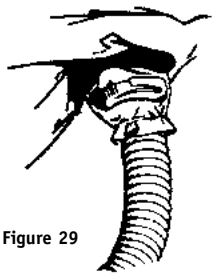
Figure 29

4. Engage clamp locks and squeeze together until tight. Air entry sleeve should not be twisted or restricted (see Figure 30). If so, then remove the clamp and repeat steps 2-4.
5. With PAPR blower unit running, put on RT Series respirator hood. Pull the hood over your head until the neck cuff is securely around your neck.
6. Ensure that the neck cuff is down below the chin and that the air outlets of the cuff are not restricted. If the neck cuff (see Figure 26) is not below the chin, then pull down before continuing (See Figure 27).

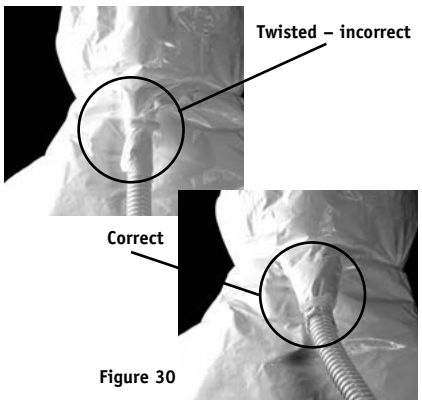

Figure 30

⚠ WARNING

The user should ensure that the neck cuff is unrestricted all around the neck to allow proper inflation and reduce restrictions.

Battery run time will be reduced by a restricted or improperly donned hood.

For hoods with a threaded port at the rear (designated with a "T" suffix), Breathing Tubes PAHBT, PAHBTXS, PAHBTXL will attach to the hood by the threading into the port at the rear (See Figure 23A).

NOTE

The RT3 and RT4 hoods have an adjustable velcro strap near the top of the lens that allows the user to customize the curvature of the lens to his/her personal preference. This strap may be removed if desired.

7. Make sure that the breathing tube is not twisted after donning.
8. Tuck inner bib of hood into shirt or protective clothing (see Figure 25).
9. Pull respirator outer bib over collar of shirt or protective clothing. Pull the long outer bib down on the outside of clothing and secure with tie down straps or tape (if employer operating procedures will allow.)

Loose-Fitting Facepiece Use

Installing Breathing Tube Assembly in Loose-Fitting Facepieces

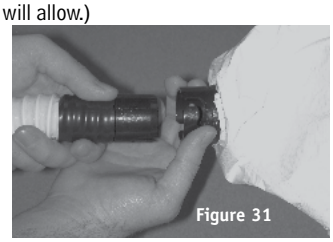

Figure 31

1. The 20LFM, 20LFL, 20LF2S, 20LF2M and 20LF2L loose-fitting facepieces have a sewn-in breathing tube connector on the back. The PA20LFBT breathing tube has a special connector on the hood end with bayonet type pins.
2. Insert the bayonet connector of the PA20LFBT breathing tube in the hood connector and turn clockwise until it locks in place (see Figure 31).

Available in large 20LF2L or 20LFL, medium 20LF2M or 20LFM, and small 20LF2S. Select the size that fits most comfortably and matches your head size. Remove the protective cover from the visor. Pull the hood over your head and adjust the headband around your head and the elasticized edge of the faceseal under your chin. Make sure that the breathing tube is not twisted after donning.

Final Donning:

- Attach the other end of breathing tube to blower unit (if not already attached) by screwing adapters together.
- Remove any protective film covering the lens of the headpiece.
- Put on the belt and blower assembly and make any final adjustments to the belt as necessary, keeping the breathing tube and hood behind the head.
- Turn the blower on by depressing and holding the on/off switch (Figure 32) for approximately 1 second indicated by a short beep.
- Buckle the belt onto the waist (blower unit should be in the lower back of the wearer).
- Don the headpiece.
- Choose speed setting (see below).
- Place the hood on the head making any final adjustments to the fit as required at this time to ensure a comfortable and stable fit.
- Tuck inner bib into coveralls or shirt if using a hood with inner bib.

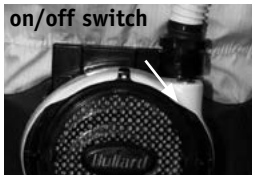

Figure 32

⚠ WARNING

Do not enter a hazardous area until you are sure that the blower and hood are fully operational and the blower is running. The user should periodically leave the hazardous area to check the airflow through the system. If the low battery or low flow alarm should sound, or if the user experiences any difficulty in breathing, or senses any taste or any odors from the hazard, the user should leave the hazardous area immediately. Failure to observe these warnings could result in death or serious injury.

Final Donning

	Front	Back
CC20 Single Bib		
CC20 Double Bib		
RT Series		
20LFL		
20LF2L		
GRH		

Speed Selection

The EVA1 Blower is equipped with the ability for the user to select one of two speeds for operation.

When the unit is initially turned on, the blower will operate at approximately 8.5 cfm = 240 lpm (high speed). Note: The battery life is reduced at the higher speed.

Pressing the on/off switch will change the speed to approximately 7 cfm = 198 lpm (low speed).

Pressing the on/off switch additional times will toggle the unit between the two speeds.

NOTE

Speed change is confirmed by a short beep.

Low Battery Alarm and Low Flow Alarm

The EVA1 Blower unit is equipped with a Low Battery Alarm and a Low Flow Alarm.

The Low Battery Alarm will sound an intermittent 77 dba electronic beep indicating that there are approximately 15 minutes of remaining battery capacity. The delays between beeps will get shorter and shorter as time runs out.

The Low Flow Alarm will sound a continuous 77 dba electronic beep indicating that the flow to the hood has dropped below the design specification of 170 lpm = 6.0 CFM.

When either of these alarms sounds, the user should immediately do the following:

Leave the hazard area

Remove the headpiece

Disconnect the breathing tube from the hood

Check the airflow with the airflow indicator (see page 4).

Check the operation of the low-flow alarm by blocking the end of the breathing tube. The device will first ramp up to compensate and if correct flow cannot be achieved, the alarm will sound within 5 seconds.

If the airflow indicator indicates insufficient airflow, the battery should be fully charged (see "Battery Pack" on page 2), and/or the filter/cartridge should be replaced.

NOTE

The EVA1 blower is provided with a circuit to protect the battery. It will not allow the battery to be discharged below a safe voltage for the cells, regardless of airflow, without the Alarm sounding. When the battery reaches the voltage cutoff it will automatically cease operation. When the Low Battery Alarm sounds and the filter cartridges are not clogged, the battery should be recharged to protect the battery and thereby prolong the working life of the unit. If the ball in the Airflow Indicator is BELOW or PARTLY BELOW the PASS LINE with a fully charged battery, the filter cartridges may need to be changed.

Doffing the Respirator

Prepare to doff the blower, battery and hood in a safe, hazard-free area and do the following (in conjunction with your employer's standard operating procedures):

- Remove the hood.
- Turn the blower off by holding down the on/off switch for 5 seconds. This is confirmed by a long beep and a shut down of the motor.
- Remove the waist belt.
- Disconnect the hood from the breathing tube.
- Disconnect the breathing tube from the blower.
- Clean and inspect components as necessary.
- Place battery on charger (as desired).
- Place components in storage.

⚠ WARNING

The use of any filter/cartridge not approved with the EVA1 blower unit may put the user at risk and could result in death or serious injury.

Troubleshooting

The following guide will assist you in troubleshooting to locate possible issues with your respirator:

Circumstance	Possible Cause(s)	Solution
Low Battery Alarm is sounding	Low Voltage	Charge the battery
	Blower malfunction	Return blower for anyalysis
Low Flow Alarm is sounding	Clogged/damaged air-purifying filter element	Replace the filter/cartridge
	Battery Low	Re-charge the battery
	Blower malfunction	Leave hazardous area immediately and check equipment. If the problem persists and no damage is found, return equipment for repair. Replace breathing tube and/or hood.
	Hood neck cuff is restricting flow	Adjust neck cuff position
Smell or taste contaminant	Equipment damaged	Leave hazardous area immediately and check equipment
	Filter needs to be replaced	Replace filter
	Low airflow	Leave hazardous area immediately and check equipment If the problem persists and no damage is found, return equipment for repair
Blower unit does not run full service life	Damaged Battery	Return battery for analysis
	Malfunctioning Battery Charger	Return charger for analysi
	Hood neck cuff is restricting flow	Adjust neck cuff position

EVA Series Approval Label

EVA Series Powered Air-Purifying Respirator
This respirator is approved only in the following configurations:

Bullard
Cynthiana, KY 41031 USA
1-800-827-0423

| | | RESPIRATOR COMPONENTS | | |

Cleaning

⚠ WARNING

Avoid contaminant entry into the breathing tube, as this will compromise respiratory protection and could result in death or serious injury. Consult your local safety professional if you suspect that contaminant has entered the breathing tube.

When cleaning the equipment, do the following:

- Ensure water does not enter filter/cartridges. Replace wet filter/cartridges.
- DO NOT use gasoline, organic-based solvents, or chlorinated degreasing fluids (such as trichloroethylene), as they will cause damage.
- DO NOT immerse the equipment in water or other cleaning fluid, as this may cause contamination in the breathing tube and blower interior that will be difficult to remove.
- Use a lint-free cloth moistened in a mild solution of soap and warm water to clean the outer surface of the equipment.

Failure to observe the instructions and warnings in this manual invalidates all performance statements and approvals for this equipment and could result in death or serious injury.

The following chemicals have been tested and approved as cleaning agents for the blower housing, belt and battery:

A. Process NPD (1.256) from Steris
B. Spor Klenz (undiluted) from Steris
C. Clorox liquid bleach at 10% concentration
D. Sani-Cloth HB wipes
E. 100% Methanol
F. 70% IPA

Once filter/cartridges have reached the end of their useful life, discard in accordance with federal, state, and local guidelines, and in conformance with plant safety regulations.

Consult the appropriate CC20, RT or GR50 Series Hood User Manual for cleaning instructions for the hood components.

Storage

When the blower is completely dry, store in a clean, dry area, away from direct sunlight and sources of direct heat.

The storage temperature should be between 32º F to 90º F (0º C to 32º C) with humidity less than 90% RH.

Consult the appropriate CC20, RT or GR50 Series Hood User Manual for storage instructions on hood components

One Year Limited Warranty

Bullard warrants to the original purchaser that the EVA Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood will be free of defects in material and workmanship under normal use and service for a period of one (1) year from the date of purchase. Bullard's obligation under this warranty is limited to repairing or replacing, at its option, articles that are returned within the warranty period and that are, after examination, shown to Bullard's satisfaction to be defective, subject to the following limitations;

a) EVA Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must be returned to the Bullard factory with shipping charges prepaid.

b) EVA Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must not be altered from its original factory configuration.

c) EVA Powered Air-Purifying Respirator and Loose-Fitting Facepiece or Hood must not have been misused, subjected to negligent use, or damaged in transport.

d) The date of purchase is within the one year warranty period. (A copy of the purchaser's original invoice showing the date of purchase is required to validate warranty coverage.)

In no event shall Bullard be responsible for damages for loss of use or other indirect, incidental, consequential or special costs, expenses or damages incurred by the purchaser, notwithstanding that Bullard has been advised of the possibility of such damages.

ANY IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO ONE (1) YEAR FROM THE DATE OF PURCHASE OF THIS PRODUCT.

Some states do not allow the exclusion or limitation of incidental or consequential damages, or allow limitations on how long an implied warranty lasts, so the above limitations or exclusion may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

Return Authorization

The following steps must be completed before Bullard will accept any returned goods. Please read carefully.

Follow the steps outlined below to return goods to Bullard for repair or replacement under warranty or for paid repairs:

1. Contact Bullard Sales Support by telephone or in writing at:

   Bullard
   1898 Safety Way
   Cynthiana, KY 41031-9303
   Toll-free: 877-BULLARD (285-5273)
   Phone: 859-234-6616

   In your correspondence or conversation with Sales Support, describe the problem as completely as possible. For your convenience, your sales support specialist will try to help you correct the problem over the phone.

2. Verify with your sales support specialist that the product should be returned to Bullard. Sales Support will provide you with written permission and a return authorization number as well as the labels you will need to return the product.
3. Before returning the product, decontaminate and clean it to remove any hazardous materials which may have settled on the product during use. Laws and/or regulations prohibit the shipment of hazardous or contaminated materials. Products suspected to be contaminated will be professionally discarded at the customer's expense.
4. Ship products to be returned, including those under warranty, with all transportation charges pre-paid. Bullard cannot accept returned goods on a freight collect basis.
5. Returned products will be inspected upon return to the Bullard facility. Bullard Sales Support will telephone you with a quote for required repair work which is not covered by warranty. If the cost of repairs exceeds stated quote by more than 20%, your sales support specialist will call you for authorization to complete repairs. After repairs are completed and the goods have been returned to you, Bullard will invoice you for actual work performed.

Ordering Information

Respirator Assemblies (includes blower, battery, charger, breathing tube and hood) *Add DB suffix for vinyl belt

Loose Fitting Facepiece Systems:

EVA20LF2L	Tychem QC loose-fitting facepiece system - large
EVA20LF2M	Tychem QC loose-fitting facepiece system - medium
EVA20LF2S	Tychem QC loose-fitting facepiece system - small

Single Bib Hood Systems:

EVA20TJ	Tychem QC single bib hood system
EVA20TP	Tychem QC single bib hood system with solvent resistant lens

Double Bib Hood Systems:

EVA20TIC	Tychem QC double bib hood system
EVA20SIC	Tychem SL double bib hood system
EVA20TPC	Tychem QC double bib hood system with solvent resistant lens
EVA20TICS	Tychem QC extra long double bib hood system with taped seams
EVA20TICH	Tychem QC double bib hood for hard hat system (hard hat included)
EVA20SICH	Tychem SL double bib hood for hard hat system (hard hat included)
EVART3	Tychem QC headband-free extra large lens double bib hood system
EVART4	Tychem SL headband-free extra large lens double bib hood system
EVAGRH	Nomex double bib hood for grinding system

Blower Assemblies

EVA1	Blower unit only
EVA2	Blower unit, battery and charger
EVA3	Blower unit, battery, charger and HEPA filter

Replacement Batteries and Chargers

EVASMC	Quick charger (1 port)
EVASMC2	Analyzing Charger
EVAGC	Table top gang charger for EVABAT1 (6 ports)
EVABAT1	Lithium Polymer Battery Pack (black)

Replacement Cartridges

PAPRFC3	HE (6 per box)
PAPRFC4	OV/AG/HE (6 per box)

Respirator Hoods

Single bib hood, for use with headband suspension

20TJ/20TJT	Tychem QC 20RT headband suspension
20TJN/20TJNT	Tychem QC No headband suspension
20TP/20TPT	Tychem QC 20RT headband suspension, solvent-resistant polyester lens
20TPN/20TPNT	Tychem QC No headband suspension, solvent-resistant polyester lens

Double bib hood for use with headband suspension

20TIC/20TICT	Tychem QC 20RT headband suspension
20TICN/20TICNT	Tychem QC No headband suspension
20TPC/20TPCT	Tychem QC 20RT headband suspension, solvent-resistant polyester lens
20TPCN/20TPCNT	Tychem QC No headband suspension, solvent-resistant polyester lens
20TICS/20TICST	Tychem QC 20RT headband suspension, taped and sealed seams
20TICSN/20TICSNT	Tychem QC No headband suspension, taped and sealed seams
20SIC/20SICT	Tychem SL 20RT headband suspension, taped and sealed seams
20SICN/20SICNT	Tychem SL No headband suspension, taped and sealed seams
20SICV/20SICVT	Tychem SL 20RT headband suspension, taped and sealed seams, PVC lens
20SICVN/20SICVNT	Tychem SL No headband suspension, taped and sealed seams, PVC lens

Double bib hood for use with Bullard hard hat

20TICH/20TICHT	Tychem QC Hard hat not included
20SICH/20SICHT	Tychem SL Hard hat not included, taped and sealed seams
20SICVH/20SICVHT	Tychem SL Hard hat not included, taped and sealed seams, PVC lens

Double bib grinding hood for use with Bullard hard hat or suspension

GRH/GRHT	Nomex, Hard hat not included

Loose fitting facepieces with sewn-in suspension

20LFL	Tychem QC, Large
20LFM	Tychem QC, Medium
20LF2S	Tychem QC, Small, narrow profile
20LF2M	Tychem QC, Medium, narrow profile
20LF2S	Tychem QC, Large, narrow profile

Double bib hood for use without a headband suspension

RT1/RT1T	Tychem QC
RT2/RT2T	Tychem SL
RT3/RT3T	Tychem QC
RT4/RT4T	Tychem SL

Accessory Items for Hoods

20LCL	Mylar lens covers, CC20 Series (25/pkg)
RTLC	Mylar lens covers, RT Series (25/pkg)
MB1	Outer lens, GRH Series (10/pkg)
20LC	Mylar lens covers, GRH Series (25/pkg)

Headband Suspensions and Hard Hats

20TG	Standard headband suspension
20RT	Sure-Lock® ratchet headband suspension
3000	Hard hat with standard suspension, white
3000R	Hard hat with ratchet suspension, white
51WHP	Hard hat with standard suspension, white
51WHR	Hard hat with ratchet suspension, white

Accessories for Headbands Suspension and Hard Hats

RS6PC	Standard replacement suspension for 30WHP hard hat
RS6RC	Replacement ratchet suspension for 30WHR hard hat
RS4PC	Standard replacement suspension for 51WHP hard hat
RS4RC	Replacement ratchet suspension for 51WHR hard hat
20NC	Chinstrap for 20TG and 20RT headband suspension
ES42	Chinstrap for 3000 and 5100 hard hats

Replacement Parts and Accessories

EVABELT1	Replacement belt
EVABELT2	Vinyl replacement belt
EVAEXT1	Extension belt kit
PAPRSUSP1	PAPR suspenders (1 pair)
PA1AFI	Air flow indicator
PAHBT	Powered air hood breathing tube assembly; standard length
PAHBTXS	Powered air hood breathing tube assembly; short length
PAHBTXL	Powered air hood breathing tube assembly; long length
PA1BT	Hood breathing tube assembly; includes tube and clamp; standard length
PA1BTXS	Hood breathing tube assembly; includes tube and clamp; short length
PA1BTXL	Hood breathing tube assembly; includes tube and clamp; long length
PA20LFBT	Loose fitting facepiece breathing tube assembly; standard length
PA20LFBTXS	Loose fitting facepiece breathing tube assembly; short length
PA20LFBTXL	Loose fitting facepiece breathing tube assembly; long length
PA1BTS	Breathing tube/cartridge seal
EVABAT1	Battery pack
S18051	Breathing tube clamp (10/pack)

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